



# ***STIC Search Report***

***EIC 1700***

**STIC Database Tracking Number: 98721**

**TO: Fred Zitomer  
Location: CP3 8E14  
Art Unit: 1713  
July 16, 2003**

**Case Serial Number: 09/856774**

**From: John Calve  
Location: EIC 1700  
CP3/4-3D62  
Phone: 703-308-4139**

**John.calve@uspto.gov**

## **Search Notes**

## Search Results

### Feedback Form (Optional)



Scientific & Technical Information Center

The search results generated for your recent request are attached. If you have any questions or comments (compliments or complaints) about the scope or the results of the search, please contact *the EIC searcher* who conducted the search *or contact*:

Kathleen Fuller, Team Leader, 308-4290, CP3/4 3D62

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#### *Voluntary Results Feedback Form*

➤ *I am an examiner in Workgroup:*  *Example:*

➤ *Relevant prior art found, search results used as follows:*

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

*Types of relevant prior art found:*

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature  
(journal articles, conference proceedings, new product announcements etc.)

➤ *Relevant prior art not found:*

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Search results were not useful in determining patentability or understanding the invention.

**Other Comments:**

=> file reg

FILE 'REGISTRY' ENTERED AT 10:07:37 ON 16 JUL 2003  
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Property values tagged with IC are from the ZIC/VINITI data file  
provided by InfoChem.

STRUCTURE FILE UPDATES: 15 JUL 2003 HIGHEST RN 548735-19-9  
DICTIONARY FILE UPDATES: 15 JUL 2003 HIGHEST RN 548735-19-9

=> d his

(FILE 'HOME' ENTERED AT 09:28:32 ON 16 JUL 2003)

FILE 'HCA' ENTERED AT 09:29:28 ON 16 JUL 2003

L1 8031 S PETROVA ?/AU  
L2 134 S AMEDURI ?/AU  
L3 754 S KOSTOV ?/AU  
L4 498 S BOUTEVIN ?/AU  
L5 11 S L1 AND L2 AND L3 AND L4  
L6 1 S L5 AND (COPOLYM? AND TRIFLUOROVINYL?)/TI  
SEL L6 RN

FILE 'REGISTRY' ENTERED AT 09:30:16 ON 16 JUL 2003

L7 27 S E1-E27  
L8 972594 S PMS/CI  
L9 5 S L7 AND L8  
L10 22 S L7 NOT L9  
L11 15 S L10 AND ?TRIFLUORO?/CNS  
L12 9 S L11 NOT (0-10/CL OR 0-3/NR)  
L13 1 S L12 AND PENTANOIC ACID  
L14 8 S L12 AND 1-8/C  
L15 7 S L14 NOT L13  
L16 9005 S FLPO/PCT - *FLPO = fluorinated polymers w/ = in monore*  
L17 3590 S L16 AND 0-15/CL  
L18 5415 S L16 NOT L17  
E 1,1-DIFLUOROETHENE/CN  
L19 1 S E3  
L20 1 S E4  
L21 1978 S 75-38-7/CRN  
E 1,1,2-TRIFLUOROETHENE/CN  
L22 1 S E3  
L23 98 S 359-11-5/CRN  
E TETRAFLUOROETHENE/CN  
L27 1 S E3  
L28 1 S E4  
L29 3923 S 116-14-3/CRN  
L30 5095 S L21 OR L23 OR L29  
ACTIVATE ZITOM/L  
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L31 STR  
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FILE 'LREGISTRY' ENTERED AT 09:43:50 ON 16 JUL 2003  
L32 STR L31

FILE 'REGISTRY' ENTERED AT 09:52:47 ON 16 JUL 2003  
L33 21 S L32  
L34 2 S L33 AND L8

FILE 'LREGISTRY' ENTERED AT 09:53:58 ON 16 JUL 2003  
L35 STR L32

FILE 'REGISTRY' ENTERED AT 09:59:25 ON 16 JUL 2003

L36 22 S L35  
L37 2 S L36 AND L8  
L38 380 S L35 FULL *← Main structure search only yielded 380 rns*  
SAVE L38 ZITOMER744/A  
L39 376 S L38 NOT L15  
L40 383 S L38 OR L15  
L41 3 S L40 NOT L38  
L42 9 S L38 AND L8  
L43 4 S L38 AND L18  
L44 4 S L38 AND L30

FILE 'HCA' ENTERED AT 10:04:19 ON 16 JUL 2003

L45 5 S L42  
L46 4 S L43  
L47 4 S L44  
L48 5 S L45 OR L46 OR L47  
L49 5 S L48 OR L6  
L50 4 SEA ABB=ON PLU=ON L38 AND L16  
L51 99 SEA ABB=ON PLU=ON L40  
L52 79 SEA ABB=ON PLU=ON L51 AND 1907-1998/PY *← These answers for compd. only. (no polyn./monomer)*  
L53 62766 SEA ABB=ON PLU=ON L30  
L54 2 SEA ABB=ON PLU=ON L52 AND L53  
D SCAN  
L55 1514211 SEA ABB=ON PLU=ON POLYMERIZ? OR POLYMERIS? OR POLYM# OR  
CURE# OR CURING# OR DIGEST? OR CROSSLINK? OR CROSS(W)LINK? OR  
VULCANIZ? OR VITRIF? OR GEL?  
L56 8 SEA ABB=ON PLU=ON L52 AND L55  
L57 7 SEA ABB=ON PLU=ON L56 NOT L49  
D SCAN  
L58 3873 SEA ABB=ON PLU=ON C2F4 OR C2F2H2 OR C2H2F2 OR C2F3H OR C2HF3  
L59 0 SEA ABB=ON PLU=ON L57 AND L58  
L60 1 SEA ABB=ON PLU=ON L52 AND L58

FILE 'REGISTRY' ENTERED AT 10:07:37 ON 16 JUL 2003

=> d que stat L38  
L35 STR

21  
F  
~  
CF2=C~G1~CH2~G2 O~Ak S~Ak P @13 28  
1 2 3 22 23 @6 7 @10 11 @26 27  
OH  
~  
Ak~OH

REP G1=(0-6) CH2  
VAR G2=6/10/13/26  
NODE ATTRIBUTES:

# SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: FRED ZITOMER Examiner #: 69047 Date: 7/14/03  
Art Unit: 1713 Phone Number 308-2461 Serial Number: 29/856,274  
Mail Box and Bldg/Room Location: P3-8E14 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.  
\*\*\*\*\*

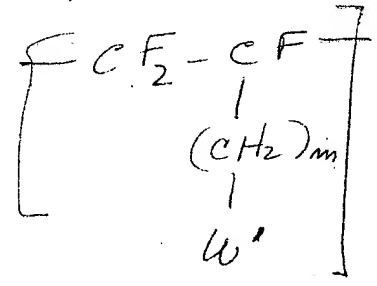
Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Functional Julec-oxymyl Monomers And Their  
Condensation With Polyoxalones  
Inventors (please provide full names): Pelton et al

Earliest Priority Filing Date: 11/25/98

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Compound of Formula (I) as per Claim 20  
and Polymer thereof - as for example  
any polymer having the monomer unit



as in claim 31

STAFF USE ONLY		Type of Search	Vendors and cost where applicable
Searcher: <u>John Cahn</u>	NA Sequence (#) <u>4</u>	STN <u>15</u>	
Searcher Phone #:	AA Sequence (#)	Dialog	
Searcher Location:	Structure (#)	Questel/Orbit	
Date Searcher Picked Up: <u>7/14/03</u>	Bibliographic	Dr.Link	
Date Completed: <u>7/15/03</u>	Litigation	Lexis/Nexis	
Searcher Prep & Review Time: <u>240</u>	Fulltext	Sequence Systems	
Clerical Prep Time:	Patent Family	WWW/Internet	
Online Time: <u>120 min</u>	Other	Other (specify)	

CONNECT IS E2 RC AT 10  
DEFAULT MLEVEL IS ATOM  
GGCAT IS LIN LOC AT 7  
GGCAT IS LIN LOC AT 11  
GGCAT IS LIN LOC AT 26  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE  
L38 380 SEA FILE=REGISTRY SSS FUL L35

100.0% PROCESSED 6779 ITERATIONS 380 ANSWERS  
SEARCH TIME: 00.00.01

=> file hca

FILE 'HCA' ENTERED AT 10:08:17 ON 16 JUL 2003  
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FILE COVERS 1907 - 10 Jul 2003 VOL 139 ISS 3  
FILE LAST UPDATED: 10 Jul 2003 (20030710/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d L49 1-5 cbib abs hitstr

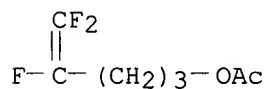
L49 ANSWER 1 OF 5 HCA COPYRIGHT 2003 ACS  
133:18003 Functional **trifluorovinyl** monomers and their  
**copolymerization** with fluorinated olefins. Petrova, Petya  
; Ameduri, Bruno; Kostov, Georges; Boutevin,  
Bernard (Solvay (Societe Anonyme), Belg.). PCT Int. Appl. WO  
2000031009 A1 20000602, 39 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO,  
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU,  
ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG,  
CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR,  
NE, NL, PT, SE, SN, TD, TG. (French). CODEN: PIXXD2. APPLICATION: WO

1999-EP9147 19991122. PRIORITY: FR 1998-14931 19981125.  
AB CF<sub>2</sub>:CF(CH<sub>2</sub>)<sub>m</sub>W [m = 1-3; W = CH(OH)CH<sub>2</sub>OH, PR<sub>1</sub>R<sub>2</sub>, P(:O)R<sub>3</sub>R<sub>4</sub>, P(:O)R<sub>6</sub>(OR<sub>5</sub>), P(:O)(OR<sub>7</sub>)(OR<sub>8</sub>), oxiranyl, or YZ; R<sub>1</sub>-4 = H, C<sub>1</sub>-20 alkyl, or (substituted) aryl; R<sub>5</sub>, R<sub>6</sub> = H, C<sub>1</sub>-20 alkyl, (substituted) aryl (when R<sub>5</sub> = H and m = 1, R<sub>6</sub> .noteq. Ph); R<sub>7</sub>, R<sub>8</sub> = H, C<sub>1</sub>-20 alkyl, or (substituted) aryl (when m = 1, R<sub>7</sub> and R<sub>8</sub> .noteq. H or Et); Y = O or S; Z = H, CH<sub>2</sub>CH<sub>2</sub>OH, CH<sub>2</sub>CO<sub>2</sub>H, or COMe; (when W = CH(OH)CH<sub>2</sub>OH, m = 1; when Y = O, Z .noteq. H, when Y = S, m = 3)] are manufd. and polymd. with CF<sub>2</sub>:CX<sub>2</sub> (X = H or F), with the provision that when m = 1 and X = H, W .noteq. oxiranyl. The resulting copolymers are useful in the manuf. of rubbers (no data) and may be crosslinked by with C<sub>5</sub>-8 nonconjugated diene before or after deprotection of the functional groups. A typical copolymer was manufd. by polymn. of tetrafluoroethylene with 2,3,3-trifluoroallyl alc. in Bu ether in the presence of AIBN at 60-75.degree..  
IT 237392-99-3P 249935-44-2DP, hydrolyzed  
249935-44-2P  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(functional trifluorovinyl monomers and their copolymn. with fluorinated olefins)  
RN 237392-99-3 HCA  
CN 4-Penten-1-ol, 4,5,5-trifluoro-, acetate, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 219866-33-8

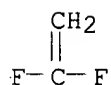
CMF C7 H9 F3 O2



CM 2

CRN 75-38-7

CMF C2 H2 F2

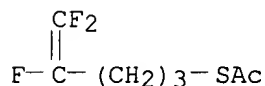


RN 249935-44-2 HCA  
CN Ethanethioic acid, S-(4,5,5-trifluoro-4-pentenyl) ester, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

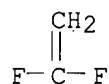
CRN 249935-40-8

CMF C7 H9 F3 O S



CM 2

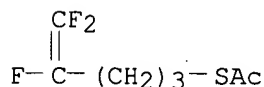
CRN 75-38-7  
CMF C2 H2 F2



RN 249935-44-2 HCA  
CN Ethanethioic acid, S-(4,5,5-trifluoro-4-pentenyl) ester, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

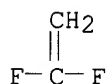
CM 1

CRN 249935-40-8  
CMF C7 H9 F3 O S



CM 2

CRN 75-38-7  
CMF C2 H2 F2



L49 ANSWER 2 OF 5 HCA COPYRIGHT 2003 ACS

132:336908 Polymer electrolyte secondary lithium battery using  
addition-polymerized fluorine-containing polycarbonate. Yoshida,  
Tomokazu; Teranishi, Tadashi; Kita, Yoshinori; Oshita, Ryuji; Noma,  
Toshiyuki; Nishio, Akiharu (Sanyo Electric Co., Ltd., Japan). Jpn. Kokai  
Tokkyo Koho JP 2000133311 A2 20000512, 7 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 1998-321456 19981026.

AB The battery comprises a polymer electrolyte composed of a homopolymer of  
CR1R2:CR3R4OCO2R5CR6:CR7R8 (R1-3, R6-8 = H, C1-4 alkyl; .gtoreq.2 of R1-3,  
.gtoreq.2 of R6-8 = H; .gtoreq.1 of R1-3, .gtoreq.1 of R6-8 =  
F-substituted; R4, R5 = C1-4 alkylene) impregnated with a nonaq.  
electrolytic soln. The battery shows high discharge capacity and long  
cycle life.

IT 268215-84-5P 268215-88-9P 268215-90-3P  
268215-92-5P 268215-94-7P

RL: DEV (Device component use); PNU (Preparation, unclassified); PREP  
(Preparation); USES (Uses)  
(polymer electrolyte secondary lithium battery using addn.-polymd.  
fluorine-contg. polycarbonate)

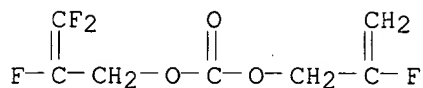
RN 268215-84-5 HCA

CN Carbonic acid, 2-fluoro-2-propenyl 2,3,3-trifluoro-2-propenyl ester,  
homopolymer (9CI) (CA INDEX NAME)

CM 1



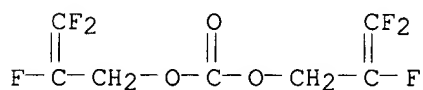
CRN 268215-83-4  
CMF C7 H6 F4 O3



RN 268215-88-9 HCA  
CN 2-Propen-1-ol, 2,3,3-trifluoro-, carbonate (2:1), homopolymer (9CI) (CA INDEX NAME)

CM 1

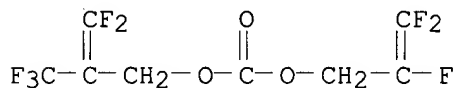
CRN 268215-87-8  
CMF C7 H4 F6 O3



RN 268215-90-3 HCA  
CN Carbonic acid, 3,3-difluoro-2-(trifluoromethyl)-2-propenyl  
2,3,3-trifluoro-2-propenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

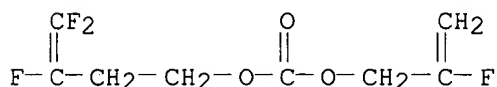
CRN 268215-89-0  
CMF C8 H4 F8 O3



RN 268215-92-5 HCA  
CN Carbonic acid, 2-fluoro-2-propenyl 3,4,4-trifluoro-3-butenyl ester,  
homopolymer (9CI) (CA INDEX NAME)

CM 1

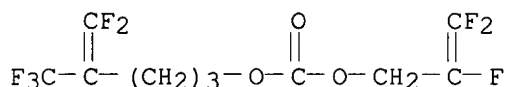
CRN 268215-91-4  
CMF C8 H8 F4 O3



RN 268215-94-7 HCA  
CN Carbonic acid, 5,5-difluoro-4-(trifluoromethyl)-4-pentenyl  
2,3,3-trifluoro-2-propenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 268215-93-6  
CMF C10 H8 F8 O3



L49 ANSWER 3 OF 5 HCA COPYRIGHT 2003 ACS

131:337430 Synthesis and polymerization of fluorinated monomers bearing a reactive lateral group. Part 10. Copolymerization of vinylidene fluoride (VDF) with 5-thioacetoxyl-1,1,2-trifluoropentene for the obtaining of a novel PVDF containing mercaptan side-groups. Ameduri, Bruno; Boutevin, Bernard; Kostov, Georges K.; Petrova, Petya (ESA 5076, Ecole Nationale Supérieure de Chimie, 8 Rue de l'Ecole Normale, Montpellier, 34296, Fr.). Designed Monomers and Polymers, 2(4), 267-285 (English) 1999. CODEN: DMPOF3. ISSN: 1385-772X. Publisher: VSP BV.

AB The synthesis of a perfluorovinyl thioacetoxyl monomer (FSAc) and its copolymn. with vinylidene fluoride (VDF) were carried out. The monomer was obtained in good yield from the photochem. addn. of thiol acetic acid to 1,1,2-trifluoro-1,4-pentadiene. The FSAc monomer was first hydrolyzed into 4,5,5-trifluoro-4-ene mercaptopentane, which did not homopolymerize, but under radical conditions underwent mainly a five-member cyclization. The FSAc monomer was copolymd. with VDF either in bulk or in soln. 19F-NMR spectroscopy was used to quantify the monomer units in the copolymer. The reactivity ratio,  $r_1$ , of monomers was detd. from the Kelen and Tudos and the Tidwell and Mortimer methods,  $r_{\text{VDF}} = 0.63$  and  $0.60$  and  $r_{\text{FSAc}} = 0.43$  and  $0.41$  at  $120^\circ\text{C}$ , resp. An azeotropic point was obsd. at 61 mol% of VDF and below this level, lower incorporation of FSAc in the copolymer took place. The Alfrey-Price  $Q$  and  $e$  values of the trifluorovinyl thioacetoxyl monomer were calcd. to be  $0.022$  (from  $Q_{\text{VDF}} = 0.008$ ) or  $0.044$  (from  $Q_{\text{VDF}} = 0.015$ ) and  $+1.56$  (vs.  $e_{\text{VDF}} = 0.40$ ) or  $+1.66$  (vs.  $e_{\text{VDF}} = 0.50$ ), resp., indicating that FSAc is an electron-accepting monomer. The monomers led to random fluorinated copolymers bearing thioacetoxyl side-groups, being easily hydrolyzed into lateral thiol functions. The vinylidene fluoropolymer contg. mercaptan side-groups was cured with 1,5-hexadiene to produce an insol. network.

IT **249935-44-2P**, 1,1,2-Trifluoro-5-thioacetoxypentene-vinylidene fluoride copolymer

RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(prepn. of fluorinated thioacetoxyl-contg. monomers and copolymn. with vinylidene fluoride to obtain thiol-contg. fluoropolymer subsequently crosslinked with hexadiene)

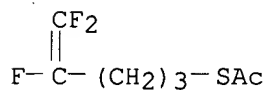
RN 249935-44-2 HCA

CN Ethanethioic acid, S-(4,5,5-trifluoro-4-pentenyl) ester, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

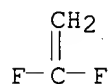
CRN 249935-40-8

CMF C7 H9 F3 O S



CM 2

CRN 75-38-7  
CMF C2 H2 F2



L49 ANSWER 4 OF 5 HCA COPYRIGHT 2003 ACS

131:158046 Synthesis and Polymerization of Fluorinated Monomers Bearing a Reactive Lateral Group. 9. Bulk Copolymerization of Vinylidene Fluoride with 4,5,5-Trifluoro-4-ene Pentyl Acetate. Ameduri, Bruno; Bauduin, Gerard; Boutevin, Bernard; Kostov, Georges; Petrova, Petya (Laboratory of Macromolecular Chemistry, ESA (5076) CNRS Ecole Nationale Supérieure de Chimie de Montpellier, Montpellier, 34296, Fr.). Macromolecules, 32(14), 4544-4550 (English) 1999. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB Bulk copolymn. of vinylidene fluoride (VDF) with 4,5,5-trifluoro-4-ene pentyl acetate (FAC) initiated by di-tert-Bu peroxide is presented. A series of nine copolymn. reactions was investigated from initial [VDF]0/[FAC]0 molar ratios ranging from 32/68 to 95/5. Both these comonomers copolymd. in this range of copolymn. Moreover, these comonomers homopolymd. sep. in these conditions. The copolymer compns. of these random-type copolymers were calcd. by means of 1H and 19F NMR spectroscopies and allowed one to quantify the resp. amt. of each monomeric unit in the copolymer. From the Tidwell and Mortimer method, the reactivity ratios,  $r_i$ , of both comonomers were detd. showing a higher incorporation of FAC in the copolymer ( $r_{\text{FAC}} = 3.26 \pm 1.49$  and  $r_{\text{VDF}} = 0.17 \pm 0.10$  at 120 °C). Alfrey-Price's  $Q$  and  $e$  values of trifluorovinyl acetate monomer FAC were calcd. to be 0.060 (from  $Q_{\text{VDF}} = 0.008$ ) or 0.040 (from  $Q_{\text{VDF}} = 0.015$ ) and +1.14 (vs  $e_{\text{VDF}} = 0.40$ ) or +1.23 (vs  $e_{\text{VDF}} = 0.50$ ), resp., indicating that FAC is an electron-accepting monomer. The normalized monomer-diad and -triad fractions as a function of the polymer compn. were obtained from the comonomer sequence distribution theory and this was evidenced by 19F NMR anal.

IT **237392-99-3P**, 4,5,5-Trifluoro-4-penten-1-yl acetate-vinylidene fluoride copolymer

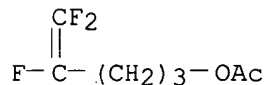
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (prepn. and characterization of)

RN 237392-99-3 HCA

CN 4-Penten-1-ol, 4,5,5-trifluoro-, acetate, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

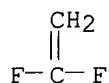
CM 1

CRN 219866-33-8  
CMF C7 H9 F3 O2



CM 2

CRN 75-38-7  
CMF C2 H2 F2



L49 ANSWER 5 OF 5 HCA COPYRIGHT 2003 ACS

82:44680 Vulcanizing a fluorine-containing rubber. Takemoto, Masayoshi; Yano, Katsumi (Daikin Kogyo Co., Ltd.). Jpn. Tokkyo Koho JP 49017858 B4 19740504 Showa, 6 pp. (Japanese). CODEN: JAXXAD. APPLICATION: JP 1970-127411 19701230.

AB Ag-contg. polymers, e.g., the reaction product of Ag<sub>2</sub>O with hexafluoropropene-perfluorovinylacetic acid-tetrafluoroethylene-vinylidene fluoride copolymer (I), were vulcanized to prep. rubbers having good thermal stability. Thus, 1485 parts water and 25 parts perfluorovinylacetic acid (II) under N in an autoclave pressured with a 45:45:10 hexafluoropropene(III)-vinylidene fluoride(IV)-tetrafluoroethylene(V) mixt., heated to 80.degree. (11 kg/cm<sup>2</sup> gage), mixed with 15 parts water contg. 2.6 parts (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub>, and polymd. for 183 min with addns. of 14:68:18:2 III-IV-V-II to maintain the pressure to prep. I which (100 parts) was treated with 5 parts Ag<sub>2</sub>O, mixed with 20 parts carbon and 20 parts MgO, and vulcanized at 200.degree. for 3 hr.

IT 53965-58-5

RL: USES (Uses)

(rubber, vulcanized, thermal stability of)

RN 53965-58-5 HCA

CN 3-Butenoic acid, 3,4,4-trifluoro-, polymer with 1,1-difluoroethene, 1,1,2,3,3,3-hexafluoro-1-propene and tetrafluoroethene, silver(1+) salt (9CI) (CA INDEX NAME)

CM 1

CRN 53965-57-4

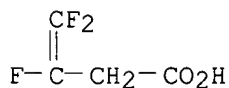
CMF (C4 H3 F3 O2 . C3 F6 . C2 H2 F2 . C2 F4)x

CCI PMS

CM 2

CRN 53965-56-3

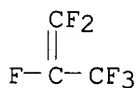
CMF C4 H3 F3 O2



CM 3

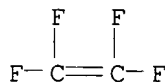
CRN 116-15-4

CMF C3 F6



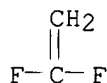
CM 4

CRN 116-14-3  
CMF C2 F4



CM 5

CRN 75-38-7  
CMF C2 H2 F2



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These records FYI only. They contain the compound but not the polymer.

=> d L57 cbib abs hitstr

L57 ANSWER 1 OF 7 HCA COPYRIGHT 2003 ACS

130:139668 Synthesis and **polymerization** of fluorinated monomers bearing a reactive lateral group. Part 4. Preparation of functional perfluorovinyl monomers by radical addition of functional mercaptans to 1,1,2-trifluoro 1,4-pentadiene. Ameduri, B.; Boutevin, B.; Kostov, G. K.; Petrova, P. (Ecole Nationale Supérieure de Chimie, ESA 5076, 8 Rue de l'Ecole Normale, Montpellier, 34296, Fr.). Journal of Fluorine Chemistry, 92(1), 77-84 (English) 1998. CODEN: JFLCAR. ISSN: 0022-1139. Publisher: Elsevier Science S.A..

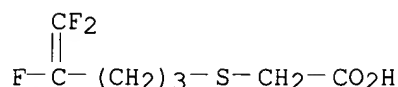
AB The synthesis of novel perfluorovinyl monomers CF<sub>2</sub>:CFC<sub>3</sub>H<sub>6</sub>SR (I) bearing hydroxyl or carboxyl as R end-groups from 1,1,2-trifluoro-1,4-pentadiene (II) is presented. They were obtained by radical addn. of .omega.-hydroxy and carboxy mercaptans to II. These addnl. reactions were performed either photochem. or in the presence of various radical initiators used at different temps. The nature of the functional group of the mercaptan and the way of initiation enabled these addns. to occur either on both double bonds of II or on the hydrogenated or fluorinated one leading to telechelic R-SCF<sub>2</sub>CFHC<sub>3</sub>H<sub>6</sub>S-R diacid or diol, to I, or to R-SCF<sub>2</sub>CFHCH<sub>2</sub>CH:CH<sub>2</sub>, resp. The amts. of these products were detd. by <sup>1</sup>H and <sup>19</sup>F NMR spectroscopy, and the reactivity of both mercaptans was also discussed.

IT 220066-01-3P 220066-07-9P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(monomer; prepn. of functional perfluorovinyl monomers by radical addn. of functional mercaptans to 1,1,2-trifluoro 1,4-pentadiene in presence of)

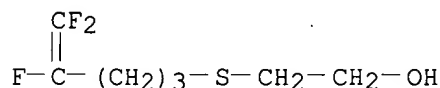
RN 220066-01-3 HCA

CN Acetic acid, [(4,5,5-trifluoro-4-pentenyl)thio]- (9CI) (CA INDEX NAME)



RN 220066-07-9 HCA

CN Ethanol, 2-[(4,5,5-trifluoro-4-pentenyl)thio]- (9CI) (CA INDEX NAME)



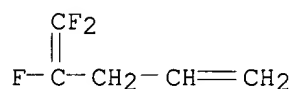
IT 401-49-0, 1,1,2-Trifluoro-1,4-pentadiene

RL: RCT (Reactant); RACT (Reactant or reagent)

(reactant in monomer prepn.; prepn. of functional perfluorovinyl monomers by radical addn. of functional mercaptans to 1,1,2-trifluoro 1,4-pentadiene in presence of)

RN 401-49-0 HCA

CN 1,4-Pentadiene, 1,1,2-trifluoro- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



=&gt; d L57 2-7 cbib abs hitstr

L57 ANSWER 2 OF 7 HCA COPYRIGHT 2003 ACS

130:125421 Synthesis and **polymerization** of fluorinated monomers bearing a reactive lateral group. Part 3. Synthesis of trifluorovinyl hydroxy and acetoxy monomers. Ameduri, B.; Boutevin, B.; Kostov, G. K.; Petrova, P. (8 Rue de l'Ecole Normale, Ecole Nationale Supérieure de Chimie, ESA 5076 (CNRS), Montpellier, 34296, Fr.). Journal of Fluorine Chemistry, 92(1), 69-76 (English) 1998. CODEN: JFLCAR. ISSN: 0022-1139. Publisher: Elsevier Science S.A..

AB The prepn. of two functional perfluorovinyl group-contg. monomers is presented. First, 1-iodo-1,2-dichloro-1,2,2-trifluoro ethane (I) was added to allyl alc. under several initiating conditions and it was found that AIBN was the best initiator. Then, the selective redn. of the iodine atom of the product in the presence of Bu<sub>3</sub>Sn gave ClCF<sub>2</sub>CFCl(CH<sub>2</sub>)<sub>3</sub>OH quant. and its dechlorination was optimized leading to F<sub>2</sub>C:CF(CH<sub>2</sub>)<sub>3</sub>OH in 50% overall yield from I. This monomer was quant. acetylated by acetyl chloride. All these products and intermediates were characterized by <sup>1</sup>H, <sup>19</sup>F, and <sup>13</sup>C-NMR spectroscopy, and simulated spectra were in very good agreement with those obsd. exptl.

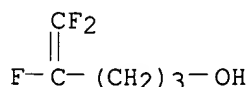
IT 109993-33-1P, 4,5,5-Trifluoro-4-penten-1-ol

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

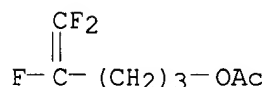
(monomer; prepn. and acetylation of trifluorinated vinylpentenol)

RN 109993-33-1 HCA

CN 4-Penten-1-ol, 4,5,5-trifluoro- (9CI) (CA INDEX NAME)



IT **219866-33-8P**, 4,5,5-Trifluoro-4-penten-1-yl acetate  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(monomer; prepn. of trifluorinated vinylpentenyl acetate)  
RN 219866-33-8 HCA  
CN 4-Penten-1-ol, 4,5,5-trifluoro-, acetate (9CI) (CA INDEX NAME)

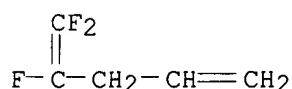


L57 ANSWER 3 OF 7 HCA COPYRIGHT 2003 ACS

129:4884 Synthesis and **polymerization** of fluorinated monomers bearing a reactive lateral group. Part 2. Synthesis of nonconjugated dienes. Ameduri, B.; Boutevin, B.; Fruchier, A.; Kostov, G. K.; Petrova, P. (ESA 5076, Ec. Natl. Super. Chim, Montpellier, 34296, Fr.). Journal of Fluorine Chemistry, 89(2), 167-172 (English) **1998**. CODEN: JFLCAR. ISSN: 0022-1139. Publisher: Elsevier Science S.A..

AB The synthesis of various .omega.-perfluorovinyl synthons, esp. 1,1,2-trifluoro-1,4-pentadiene (I) (F<sub>2</sub>C:CFCH<sub>2</sub>CH:CH<sub>2</sub>) is described. These products were prepd. according to a three-step scheme via the photochem. addn. of iodine monochloride to chlorotrifluoroethylene (CTFE) leading to ICF<sub>2</sub>CFCl<sub>2</sub>/ICFC<sub>2</sub>CF<sub>2</sub>Cl isomers, the relative amt. of which depending on the way of initiation. Their reaction with allyl acetate under radical conditions gave at least four isomers from the expected or rearranged compds. ClCF<sub>2</sub>CFClCH<sub>2</sub>CHXCH<sub>2</sub>Y or Cl<sub>2</sub>CFCF<sub>2</sub>CH<sub>2</sub>CHXCH<sub>2</sub>Y (with X, Y=I or OAc groups), the dechlorination and/or 'deiodoacetatization' of which produced 1 and various 4,4,5,5,5-perhalogenopentanes as byproducts. An optimization of the synthesis of I is proposed. All the compds. were characterized by <sup>1</sup>H and <sup>19</sup>F NMR.

IT **401-49-0P**, 1,1,2-Trifluoro-1,4-pentadiene  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(synthesis of trifluoropentadiene monomer)  
RN 401-49-0 HCA  
CN 1,4-Pentadiene, 1,1,2-trifluoro- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



L57 ANSWER 4 OF 7 HCA COPYRIGHT 2003 ACS

128:204518 Cyclization reactivities of fluorinated hex-5-enyl radicals. Dolbier Jr., , William R.; Rong, Xiao X.; Bartberger, Michael D.; Koroniak, Henryk; Smart, Bruce E.; Yang, Zhen-Yu (Department of Chemistry, University of Florida, Gainesville, FL 32611-7200, USA). Journal of the Chemical Society, Perkin Transactions 2: Physical Organic Chemistry (2), 219-231 (English) **1998**. CODEN: JCPKBH. ISSN: 0300-9580. OTHER SOURCES: CASREACT 128:204518. Publisher: Royal Society of Chemistry.

AB A kinetic study of the effect of fluorine substitution on the rates and regiochem. of hex-5-enyl radical cyclization is reported. One or more fluorines on or proximate to the double bond of the radical have relatively little electronic effect on either rate or regiochem., whereas fluorines substituted at the radical end can have a dramatic impact on both. The relative reactivities of such partially-fluorinated hex-5-enyl radicals can be understood largely in terms of polar effects on the transition state, but radical pyramidalization and, to a lesser extent,

addn. thermodyn. play a role. The relationship between these fluorine substituent effects and the cyclopolymns. of fluorinated .alpha.,.omega.-dienes are discussed.

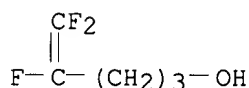
IT 109993-33-1P 136103-94-1P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(cyclization reactivities of fluorinated hex-5-enyl radicals)

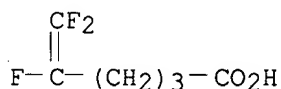
RN 109993-33-1 HCA

CN 4-Penten-1-ol, 4,5,5-trifluoro- (9CI) (CA INDEX NAME)



RN 136103-94-1 HCA

CN 5-Hexenoic acid, 5,6,6-trifluoro- (9CI) (CA INDEX NAME)



L57 ANSWER 5 OF 7 HCA COPYRIGHT 2003 ACS

128:103301 Fluorinated triallyl isocyanurates, **vulcanizable** elastomer compositions containing the same, and method for **vulcanization**. Kishine, Mitsuru; Ueta, Yutaka; Mori, Yoshiko; Oishi, Satoshi; Iseki, Katsuhiko; Iwasaki, Yasuji (Daikin Industries Ltd., Japan; Kishine, Mitsuru; Ueta, Yutaka; Mori, Yoshiko; Oishi, Satoshi; Iseki, Katsuhiko; Iwasaki, Yasuji). PCT Int. Appl. WO 9800407 A1 **19980108**, 31 pp. DESIGNATED STATES: W: CN, JP, KR, SG, US; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 1997-JP2253 19970630. PRIORITY: JP 1996-170953 19960701.

AB Tri(fluoroallyl) isocyanurates exhibit excellent **vulcanizing** properties, even when used as the **crosslinking** agents for elastomers required to be heat resistant, particularly for fluoro rubbers. The resulting **vulcanizates** have good mech. properties and heat resistance. Thus, reacting 2,2,3,3-tetrafluoro-1-propanol in Et<sub>2</sub>O at 0.degree. with LiMe gave 2,3,3-trifluoroallyl alc., 39.8 g of which was combined with Ph<sub>3</sub>P 140, cyanuric acid 11.4 g and Me<sub>2</sub>NAC 800 mL, then with a 40% toluene soln. of di-Et azodicarboxylate at a temp. lower than 30.degree., mixed for overnight and worked up to give 1,3,5-tris(2,3,3-trifluoro-2-propenyl)-1,3,5-triazine-2,4,6-trione (I). **Polymg.** the I using a peroxide (Perhexa 2.5B) gave a polymer with good heat resistance. Press **vulcanizing** and oven **vulcanizing** a compn. of tetrafluoroethylene-perfluoro(Me vinyl ether)-1,1,2,2-tetrafluoro-3-iodopropyl trifluorovinyl ether copolymer elastomer 100, a carbon black 20, Perhexa 2.5B 4, and I 4 parts gave a **vulcanizate** with permanent compression set 40.2%.

IT 41578-52-3P, 2,3,3-Trifluoroallyl alcohol

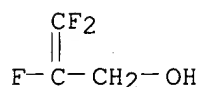
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(intermediate; reaction in manuf. of fluorinated triallyl isocyanurates for **crosslinking** of elastomer)

RN 41578-52-3 HCA

CN 2-Propen-1-ol, 2,3,3-trifluoro- (9CI) (CA INDEX NAME)





L57 ANSWER 6 OF 7 HCA COPYRIGHT 2003 ACS

67:54045 Azabicyclononanecarbodithioic acid and its derivatives for use as **vulcanization** accelerators and autoxidants. D'Amico, John J. (Monsanto Co.). Fr. FR 1463732 **19661223**, 16 pp. (French). CODEN: FRXXAK. APPLICATION: FR 1966-46315 19660118.

GI For diagram(s), see printed CA Issue.

AB 3-Azabicyclo[3.2.2]nonane-3-carbodithioates (I), where R is an ester-forming radical, a salt-forming radical, or  $\text{SCCl}_3$ , and bis(3-azabicyclo[3.2.2]nonane-3-thiocarbonyl) sulfides are prep'd. from  $\text{CS}_2$ ,  $\text{RCl}$ , and 3-azabicyclo[3.2.2]nonane (II) and are used as **vulcanization** accelerators for natural and synthetic rubber and sometimes as antioxidants. Thus, 7.6 g.  $\text{CS}_2$  was added dropwise to 12.5 g. II, 16 g. 25%  $\text{NaOH}$ , and 200 cc.  $\text{H}_2\text{O}$  at 5-15.degree., the mixt. stirred at 25-30.degree. for 1 hr., 12.7 g.  $\text{PhCH}_2\text{Cl}$  added, the mixt. heated at 50-60.degree. for 5 hrs. and cooled to 0.degree., and the ppt. washed with water until neutral to litmus and air dried at 25-30.degree. to give 99% I ( $\text{R} = \text{PhCH}_2$ ), m. 98-9.degree.. Similarly prep'd. were the following I ( $\text{R}$ , m.p., and % yield given): 2,6-dichlorobenzyl, 138-9.degree., 91.5; 3,4-dichlorobenzyl, 111-13.degree., 98.5; allyl, 56-7.degree., 99;  $\text{CH}_2:\text{CBrCH}_2$ , 71-3.degree., 84;  $\text{CMeCl}:\text{CHCH}_2$ , 84-5.degree., 97; trans-2,3-dichloroallyl, 92-4.degree., 74;  $\text{Cl}_2\text{C}:\text{CHCH}_2$ , 68-70.degree., 74.5; 1-cyclohexen-2-yl, 80-2.degree., 82.2;  $\text{Cl}_2\text{C}:\text{CClCH}_2$ , 62-3.degree., 98.5;  $\text{H}_2\text{C}:\text{CClCH}_2$ , 88-90.degree., 98; 2,3,6-trichlorobenzyl, 113-15.degree., 96.5; ar,ar,ar-trichlorobenzyl, 145-50.degree., -;  $\text{HC.tplbond.CCH}_2$ , -, 79;  $\text{Et}_2\text{NCH}_2\text{CH}_2$ , -, 99; iso- $\text{Pr}_2\text{NCH}_2\text{CH}_2$ , 60-1.degree., 97.5;  $\text{Me}_2\text{NCH}_2\text{CH}_2$ , 130-2.degree., 88;  $\text{Me}_2\text{N}(\text{CH}_2)_3$ , 114-16.degree., 90.5;  $\text{Me}_2\text{NCH}_2\text{CHMe}$ , -, 84;  $\text{Me}_2\text{NCH}_2\text{CHMeCH}_2$ , -, 56.5;  $\text{Et}_2\text{N}(\text{CH}_2)_3$ , -, 73;  $\text{F}_2\text{C}:\text{CFCH}_2\text{CH}_2$ , -, 80.5;  $\text{EtO}_2\text{CCH}_2\text{S}$ , 48-9.degree., 90.5; 2-benzothiazolyl, 177-8.degree., 94; 5-chloro-2-benzothiazolyl, 180-1.degree., 91; 6-ethoxy-2-benzothiazolyl (III), 161-3.degree., 95; Et, 119-20.degree., 99; 4-methyl-2-thiazolyl, 173-4.degree., 97; 4-methyl-5-phenylcarbamoyl-2-thiazolyl, 218-20.degree., 96; 2-benzoxazolyl, 175.degree., 87.5; 2-benzimidazolyl, 206-8.degree., 85; 6-nitro-2-benzothiazolyl, 183-4.degree., 73.5; 4,6-dimethyl-2-pyrimidinyl, 108-10.degree., 65; 5-carbamoyl-5-methyl-2-thiazolyl, 178-80.degree., 73; 5-acetyl-4-methyl-2-thiazolyl, 80-2.degree., 76.4; p-chlorophenylthiomethyl, 75-6.degree., 98; p-tert-butylphenylthiomethyl, 67-8.degree., 97.5; p-tolylthiomethyl, 81-2.degree., 97.5; phenylthiomethyl, 57-8.degree., 80.5; 5-hydroxy-4-oxo-4H-2-pyranilylmethyl, 206-8.degree., 99;  $\text{NCCH}_2\text{CH}_2$ , 88-9.degree., 1.9; phthalimidomethyl, 139-40.degree., 99; 1-phthalazinyl, 150-1.degree., 97; N-isopropylanilinocarbonylmethyl, 140-1.degree., 99;  $\text{Et}_2\text{NCOCH}_2$ , 85-6.degree., 96;  $\text{MeNHCOCH}_2$ , 126-7.degree., 99; 2-(3-azabicyclo[3.2.2]non-3-yl)-2-oxoethyl, 131-2.degree., 95; 2-(hexahydro-1H-1-azepinyl)-2-oxoethyl, 108-9.degree., 99; [(p-anilinophenyl)carbamoyl]methyl, 151-2.degree., 92; [(p-anilinophenyl)isopropylcarbamoyl]methyl, 189-90.degree., 94; 2,4-dinitrophenyl, 158-9.degree., 97;  $\text{Cl}_3\text{C}$ , 94-5.degree., 22.8;  $\text{H}_2\text{C}:\text{CC}(\text{:CH}_2)\text{CH}_2$ , -, 98.2; hexahydro-1-azepinyl, 102-4.degree., 70.5; Na, -, 100; 3-azabicyclo[3.2.3]nonyl, 186-8.degree., 98;  $\text{SCNCH}_2\text{CH}_2$ , 72-3.degree., 98; phenylenedimethylbis, 255-6.degree., 98. Similarly prep'd. were 99% IV, m. 185-6.degree.; 92.5% bis(3-azabicyclo[3.2.2]nonyl-3-thiocarbonyl) sulfide, m. 159-60.degree.; 60% 3,3'-thiobis(2-chloro-2-propene-1-thiol) bis(3-azabicyclo[3.2.2]nonane-3-carbodithioate), m. 94-6.degree.; 93.5% 1,3-phenylenedimethyl

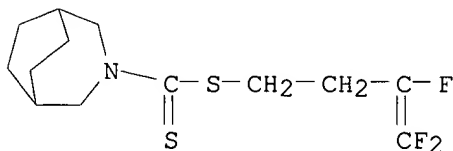
bis(3-azabicyclo[3.2.2]nonane-3-carbodithioate), m. 133-5.degree.; and 98% 2,3,5,6-tetramethyl-1,4-phenylenedimethyl bis(3-azabicyclo[3.2.2]nonane-3-carbodithioate), m. 255-6.degree.. The accelerating ability was shown by heating at 144.degree. under pressure for 45 min. a **vulcanizable** mixt. contg. fumed sheets 100, carbon black 50, ZnO 5, stearic acid 3, a satd. hydrocarbon softener 3, S 2.5, and, III 0.5 part to give a material having modulus at 300% elongation of 203 kg./cm.2, tensile strength 274 kg./cm.2, and Mooney scorch value 11.4 min.

IT **15198-90-0P**

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

RN 15198-90-0 HCA

CN 3-Azabicyclo[3.2.2]nonane-3-carbodithioic acid, 3,4,4-trifluoro-3-butenyl ester (8CI) (CA INDEX NAME)



L57 ANSWER 7 OF 7 HCA COPYRIGHT 2003 ACS

54:20395 Original Reference No. 54:4025h-i,4026a-b Elastomeric copolymers of fluorinated dienes. Bolstad, Archibald N.; Hoyt, John M. (Minnesota Mining and Manufg. Co.). US 2915508 **19591201** (Unavailable).

APPLICATION: US .

AB Elastomeric copolymers are obtained by reaction of a diene, preferably a branched one, contg. at least 1 H atom and a terminal C atom having two F substituents with another diene having at least 1 F substituent. The reaction, in the presence of a **polymerization** catalyst, can be carried out in either bulk or in aq. emulsion, the latter being preferred. Dienes of the 1st type include 1,1-difluorobutadiene, 1,1,3-trifluoro-2-methylbutadiene, perfluorobutadiene, 1,1,2-trifluorobutadiene, 1,1,2,4,4-pentafluorobutadiene, 1,1-difluoro-3-methylbutadiene, 1,1-difluoro-2-methylbutadiene, 5,5,5-trifluoro-1,3-pentadiene, 1,1,2,4,4-pentafluoro-3-methylbutadiene, and 1,1,2,4-tetrafluorobutadiene. Dienes of the 2nd type include 1,1-difluoro-2-methylbutadiene, 1,1-difluoro-3-methylbutadiene, 1,1,3-trifluoro-2-methylbutadiene, fluoroprene, 1,1-difluorobutadiene, and 1,1,2-trifluoro-1,4-pentadiene. In an example, 5 g. K stearate and 0.3 g. dodecyl mercaptan were dissolved in 120 ml. H2O and the pH adjusted to 10.2. To 6 ml. of the resulting soln., K2S2O8 (0.015 g. in 4 ml. H2O) was added and the mass frozen. Perfluorobutadiene (2.72 g.) and 2.28 g. 1,1-difluoro-3-methylbutadiene were added by distn. and the **polymerization** tube sealed. The contents were rotated at 50.degree. for 22 hrs. The polymer was coagulated by freezing, then washed and dried to give a 46% yield. The resins were elastomeric and were capable of being heat-pressed or applied as coatings.

IT **401-49-0**, 1,4-Pentadiene, 1,1,2-trifluoro-  
(elastomeric polymers with fluorinated butadienes)

RN 401-49-0 HCA

CN 1,4-Pentadiene, 1,1,2-trifluoro- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

